A phenolic laundry disinfectant caused the deaths of two infants and sickened others when improperly used in a hospital laundry. It is important to be alert to the possibility of toxic reactions from chemicals in hospital laundries, particularly those used on diapers.

FATAL PHENOL POISONING FROM IMPROPERLY LAUNDERED DIAPERS

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Syndrome

IN mid-April 1967, a strange sweating syndrome was noted among newborns in the nursery of Booth Memorial Hospital, St. Louis. The oustanding clinical features were reported thus*:

". . . Infants' clothing and brows were drenched with sweat, though they nursed avidly. Fever rose up to 103° F, respiratory rates increased, and breathing became labored. By auscultation, lungs appeared normal. Cyanosis was absent."

Other common findings included "tachycardia, hepatomegaly, and irritability followed by lethargy. Anorexia, vomiting, and diarrhea were notably absent." Stiffness of the neck, muscular fasciculations, and convulsions were not observed. Skin rashes or evidences of inflammation or irritation of the skin were not seen.

Laboratory test frequently showed "a progressive metabolic acidosis, proteinuria, a rising blood urea nitrogen, and 'pneumonia' or 'bronchiolitis' on x-ray. Bacterial and viral cultures of blood cerebrospinal fluid, nose, throat, and stool revealed no pathogens." Autopsy findings of the two fatal cases showed fatty vacuolar changes in the renal tubules of one case.

* This paper is a revision of an article, The Case of the Diaper Deaths. Hosp. Practice (Jan.), 1968, pp. 14-21.

Early Diagnosis

The syndrome appeared initially in 4 of 25 infants in the nursery. The first of the four, tentatively diagnosed as having an infection, died April 17 after treatment with antibiotics. On April 18, two sweating-syndrome infants—transferred to another hospital—received exchange transfusions and improved dramatically. On April 23, another infant who had had a fever since April 18 was recognized as having the syndrome. This child also recovered.

The St. Louis Health Department ordered the nursery closed on April 24. After a careful cleaning, it reopened May 3. However, in the following two weeks four more infants fell ill. Among them was the second fatal case. The infant declined so rapidly that there was no chance for exchange transfusion. The nursery was closed for the second time and the city's health commissioner sought additional help from the National Communicable Disease Center.

An Important Clue

Examining serums from the first eight cases via thin-layer chromatography, a consulting chemist for the city's health department determined that all the infants had absorbed a phenolic derivative. Focus shifted entirely away from bacteria and viruses to chemicals. Checks were made in deodorizers, an insect spray, baby formulas, drugs, and a disinfectant. The laundry was also checked.

The nursery was cleaned again, this time without the usual hexachlorophene disinfectant. New linens and diapers were purchased. The nursery reopened July 11.

Nothing adverse was noted for more than a month. But on August 29 an eight-day-old infant broke out with wild sweating. Again, exchange transfusion brought swift recovery, and again the nursery was closed. A review of records indicated that six infants had had a mild form of the syndrome in July and August after discharge from the nursery.

Key to the Puzzle

Finally, on September 6 one of the center investigators found the phenol source. In a laundry closet he discovered two 100-pound cardboard drums, each half the size of a common oil drum. One was almost empty and the other almost full.

The drums' labels identified the contents as "Loxene, antimicrobial laundry neutralizer and brightener for control of mildew and odor-causing bacteria." The active ingredients were listed as "3,4,4 trichlorocarbanilide 4%, and sodium pentachlorophenate 22.9%." Sodium salts of other chlorophenols and inert materials, including the neutralizing ingredients, completed the formula. The labels further displayed a critical contraindication to use: "Must not be used for laundering diapers or hospital linens," and "causes skin irritation!" were among the label warnings.

Confirmation

Thin-layer chromotography of the serum and urine of the August 29 case revealed a phenolic derivative with characteristics identical to those detected in the serums of the previous cases. Further studies with column gas chromatography and infrared methods determined that the abnormal chemical in the urine and serum of the August 29 case was pentachlorophenol, thus clearing hexachlorophene entirely. Pentachlorophenol was also identified in freshly laundered diapers from the nursery.

A check of hospital records in the light of the new findings disclosed that in December, 1966—more than three months before the first fatal case—a child in the nursery had had what probably was the sweating syndrome. Besides the nine confirmed cases, an additional dozen are suspect pentachlorophenol poisoning cases.

The Lesson

Both Loxene and a similar product, Loxsit, were removed from the market by the manufacturer, Wyandotte Chemicals Corporation. However, pediatricians, hospital administrators, housekeepers, and local health authorities should probe commercial diaper services and hospital laundries to ensure that this type of product is not in use.

The recommended quantity was one ounce of Loxene per laundering cycle, but it was ascertained that the laundry of the Booth Memorial Hospital was actually using three to four ounces. Here again, physicians and administrators should conduct periodic checks to verify that directions and instructions are read, understood, and followed.

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